Goddard Procedures and Guidelines

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APPROVED BY Signature:
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TITLE: Director

Responsible Office: 500/Applied Engineering and Technology Development

Title: DESIGN PLANNING AND INTERFACE MANAGEMENT

Preface

P1. PURPOSE

This procedure defines the process for developing design plans and devising methods for managing organizational and technical interfaces

P2. APPLICABILITY

This procedure applies to the development of all GSFC products and processes covered by the scope of the GSFC Quality Management System (see GPD 1270.3).

P3. AUTHORITY

GPD 1270.3, GSFC Quality Management System (QMS)

P4. REFERENCES

a. GPG 1270.4, Quality System

b. GPG 1310.1, Customer Agreements

c. GPG 1440.7, Control of Quality Records

d. GPG 3410.2, Personnel Training and Qualification

e. GPG 6400.1, Handling, Storage, Packaging, Marking, Preservation, and Transportation

f. GPG 8700.2, Design Development

g. GPG 8700.3, Design Validation

h. GPG 8700.4, Technical Review Program

P5. CANCELLATION

None

Procedure

1. DEFINITIONS

Product Design Lead (PDL) - The manager or leader with overall responsibility for managing the design activity, managing the technical and organizational interfaces identified during design planning, and where required, forming and leading the Product Design Team. The term refers to flight project managers, mission managers, instrument managers, subsystem technical managers, integrated product development team leaders, lead engineers, etc.

2. IMPLEMENTATION

Note: Though this procedure and its accompanying flow chart identify a specific sequence for design planning, tailoring of the sequence may be appropriate. In addition to the possibility of some steps being done in parallel, there may be an iterative nature to many of the steps. For example, several steps may be completed to a preliminary level, and then executed again to finalize design plans. The approach used is at the discretion of the PDL.

2.1 Establish Goals and Objectives

The PDL shall establish the goals and objectives for the design process as a baseline for all subsequent planning activity. Where appropriate, this includes the development of requirements and/or specifications for the product or service being designed. The design requirements shall be traceable to the customer agreement and incorporate requirements established as a result of quality planning (see GPG 1270.4).

The process for devising detailed design is addressed in GPG 8700.2.

2.2 Establish the Basic Approach to Meeting Goals and Achieving Objectives

The PDL shall document the mode of implementation of the planned activities. Considerations include, but are not limited to, the following:

a. Make or buy - Project designs will typically involve hardware, software, and/or analysis requirements that can be met with in-house (make) or out-of-house (buy) resources. The PDL shall decide the manner in which each portion of the design will be accomplished. Though no standard exists that sets the ground rules for make-or-buy decisions, there are a number of factors that influence such decisions. Examples include length of the procurement cycle and contractor delivery date, cost to contract out versus cost of in-house development, best value to the Government, commercial availability, prior commitments by in-house organizations, etc.

b. Using partnerships and agreements - The out-of-house portion of a project can be accomplished not only through the use of a contractual vehicle, but also by making use of (or creating) partnerships and/or agreements with other NASA Centers, other government agencies, industry, and universities, including such entities from other countries. The PDL shall identify what parts of the design will be achieved in this way, and with whom each partnership or agreement is made.

c. Using new designs or existing designs - The PDL shall weigh the various pros and cons associated with using existing designs versus creating new designs, and develop a strategy for the implementation of one, the other, or both. This can be done per subsystem or component, on a case by case basis.

2.3 Define an Organization and Its Responsibilities

The PDL shall define the organizational structure and distribution of responsibilities.

2.3.1 When required by the quality planning activity, create a work breakdown structure (WBS) specific to the design activity, which identifies work packages, upon which the work is organized and managed. It provides the framework against which to report cost, schedule, and technical performance.

2.3.2 Establish an organizational structure that supports the goals and objectives of the design activity. The organizational structure should also consider the relationship with the customer, and possibly include a customer representative within the organization.

2.3.3 Define task descriptions for each element identified by the organizational structure. The task description should clearly define the duties of the individual(s) (i.e., the Product Design Team) that will be assigned for that organizational element. It should also assist the PDL, or his/her support organizations, with identifying appropriate personnel for each element.

2.4 Determine Logistics Support

The PDL shall determine the needed logistics support interfaces for product handling, storage, packaging, marking, preservation, and transportation (see GPG 6400.1).

2.5 Assign Duties and Responsibilities to Qualified Personnel

Using the WBS, organizational structure, and task descriptions as tools, the PDL shall identify the appropriate support organizations from which the appropriate support organization manager assigns personnel. As needed, the support organization manager gets clarification from the PDL on the personnel qualifications and certifications required. Procedures for determining training and certification needs can be found in GPG 3410.2.

2.6 Develop a Schedule

The PDL shall generate a schedule that lays out the design activities.

Note: Considerations for developing a schedule should include availability of funding, lead times for parts and equipment, design reviews, design verification/validation points, staffing constraints, logistics-related activities, delivery dates, as well as contingency time for unexpected events. For information on reviews, verification, and validation, see GPG 8700.2 , GPG 8700.3, and GPG 8700.4.

2.7 Develop a Budget

The PDL shall establish a baseline resource plan by developing a phased budget for manpower and dollars.

Note: Estimates for civil service and/or contractor staffing, as well as for parts and material purchases, can be accomplished through the use of the WBS. Working with appropriate lead engineers or support organization managers as needed, the PDL can arrive at an estimate for the staffing and dollar needs for each element of the WBS. The WBS, schedule, and budget should be viewed as mutually dependent, reflecting the technical content, time, and cost of meeting the project's goals and objectives.

2.8 Establish Paths of Communication Among Organizations

Communication shall be maintained with the customer throughout the life of the activity.

The PDL shall define each required or anticipated communication path, and the specific interaction required along each of these paths, such as:

a. Technical interchanges - The PDL shall ensure that communication of technical requirements and information among the organizational elements is planned and managed.

b. Status reporting - The PDL shall ensure that a communication system is in place that will allow the flow of information throughout the design activity.

2.9 Establish a Method for Defining and Documenting Technical Design Interfaces

The definition of technical design interfaces is accomplished by ensuring that each interface is the responsibility of one member of the project team. The PDL shall ensure that the communication paths defined in 2.7 are fully utilized in this process.

The PDL shall establish a method for documenting each technical design interface.

Note: The accepted method for documenting a technical design interface is through the use of an Interface Control Document (ICD). ICD's are used to document and control interfaces such as mechanical, electrical, thermal, and optical.

2.10 Document and Maintain Design Plan Information

The PDL shall document the design plan information created through the use of this procedure. The specific methods used shall allow for maintainability and supportability.

The design plan information is a quality record and shall be maintained in accordance with GPG 1440.7.

2.11 Maintain Design Plan Information

The PDL shall maintain design plan information in accordance with the applicable configuration management plan (see GPG 8700.2).

3. RECORDS

Design Plans

Design Planning and Interface Management Flowchart

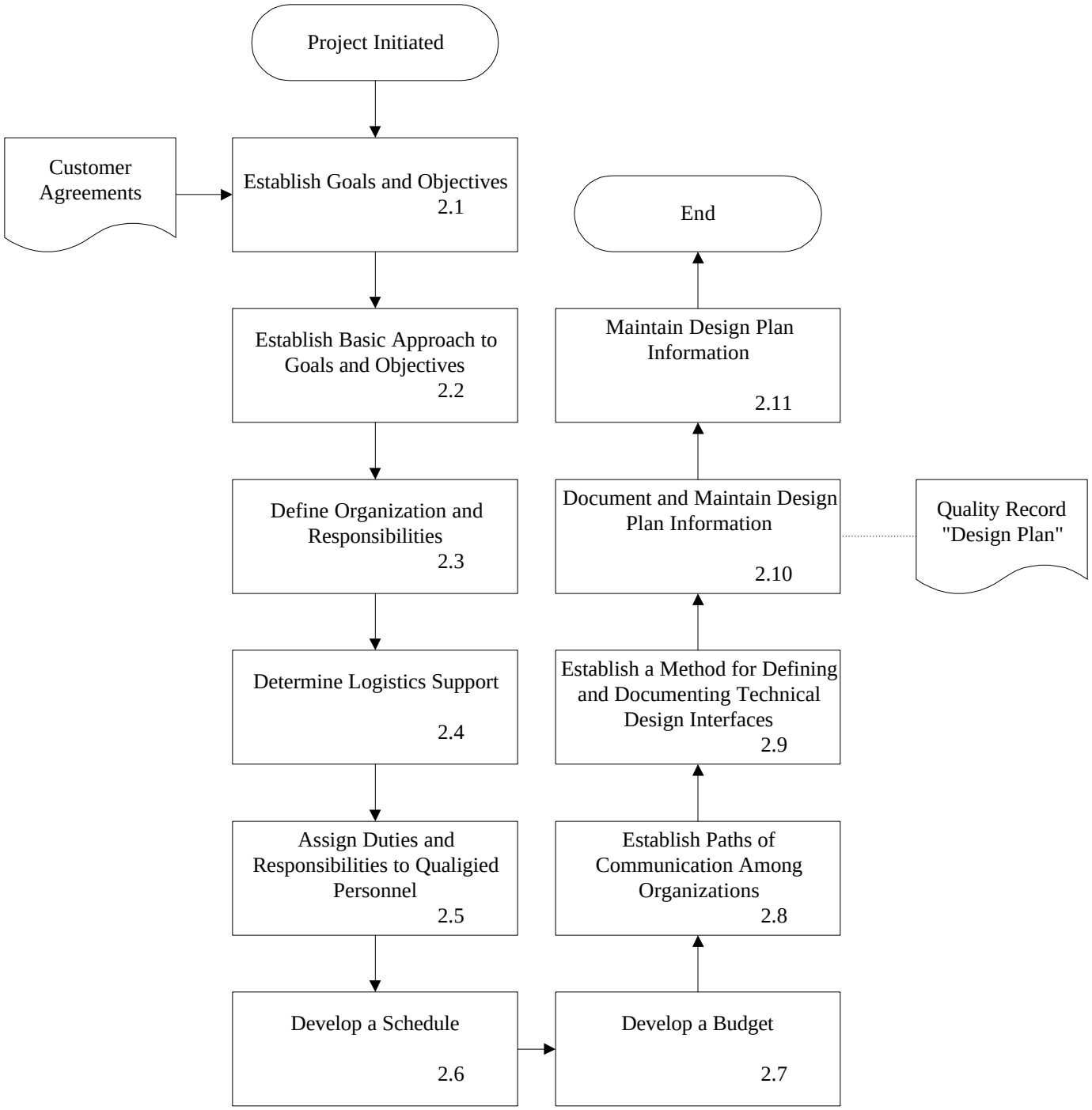

Figure 1